

An Interdisciplinary Approach for Developing Sustainable Grazing Management: Hydrology and Water Quality.

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Abstract:

Tall fescue, an important cool-season perennial forage in the humid USA, is usually infected with a fungal endophyte which produces alkaloids toxic to grazing animals. The endophyte/fescue mutualistic association, however, has broader ecological implications. We are evaluating animal, plant, soil, hydrologic and water quality responses of grazing cattle on tall fescue. An endophyte-free and two endophyte-infected fescue types (high or low alkaloid) with broiler litter (BL) or NH_4NO_3 (AN) fertilization were replicated on two 1-ha paddocks each. Two hayed control paddocks were planted to low-alkaloid fescue and fertilized with NH_4NO_3 . In the first year, nutrient concentrations ($\text{NH}_4\text{-N}$, $\text{NO}_3\text{-N}$ and $\text{PO}_4\text{-P}$) were higher from grazed paddocks about 80% of the time. Mean concentrations (skewed by few high values) in mg/L for BL, AN and control treatments were, respectively: $\text{NH}_4\text{-N}$ - 1.2, 0.6, 0.5; $\text{NO}_3\text{-N}$ - 0.3, 0.8, 1.5; $\text{PO}_4\text{-P}$ - 2.0, 0.7, 0.2. Clear fescue treatment effects have not yet emerged. But the high-alkaloid and endophyte-free types under BL had higher offsite nutrient delivery about 70% of the time. The endophyte-free fescue had higher $\text{PO}_4\text{-P}$ concentrations under AN treatment. Treatment effect on runoff is not yet established. In some paddocks 25 to 40% of the rainfall was partitioned into runoff in some events. Data were not complete due to sensor problems.

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